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| EXAMINER | |
|---|---|
| MENBERU, BENIYAM | |
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| 2626 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/966,030 | PRABHAKAR ET AL. | |
| | Examiner | Art Unit | |
| | Beniyam Menberu | 2626 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 September 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/28/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

On page 2, line 23, "predicable" should be "predictable".

Appropriate correction is required.

2. Claim 13 is objected to because of the following informalities: On line 13, "channel s" should be "channels". Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5309228 to Nakamura.

Regarding claim 1, Nakamura discloses a method for detecting and segmenting sweeps in a graphics image, comprising the steps of:

a) detecting sweep segment information from one or more color channel histograms of the graphics image (Nakamura discloses method of feature image extraction wherein the human face is the feature image to be extracted. Thus the feature image corresponds to the sweep area and the non-feature image is the non-sweep area (column 3, lines 27-44; column 12, lines 22-45); and

b) segmenting the graphics image into sweep and non-sweep areas using the sweep segment information (Nakamura divides the regions which reads into the segmentation of the image. (column 12, lines 45-55)).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5309228 to Nakamura in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998).

Regarding claim 2, Nakamura teaches all the limitations of claim 1. However Nakamura does not disclose the method as set forth in claim 1, wherein the color channel histograms of step a) are in CIELUV color space.

Shafarenko discloses using CIELUV color space for the histogram (column 2, lines 3-9).

Nakamura and Shafarenko are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the CIELUV color space selection of Shafarenko with the

image segmentation system of Nakamura to implement CIELUV based image segmentation.

The motivation to combine the reference is clear because Shafarenko teaches that the LUV color space is ideal for human vision system (page 1354, Introduction, first paragraph).

Regarding claim 3, Nakamura teaches all the limitations of claim 1. Further Nakamura discloses e) processing each of the two-dimensional histograms to detect sweep segment information (Nakamura: Nakamura discloses method of feature image extraction wherein the human face is the feature image to be extracted. Thus the feature image corresponds to the sweep area and the non-feature image is the non-sweep area (column 3, lines 27-44; column 12, lines 43-50). Shafarenko disclose the method as set forth in claim 1, step a) further including the steps:

c) transforming the graphics image to a three-dimensional histogram in color space (Shafarenko: page 1355, column 1, second paragraph);

d) estimating two-dimensional histograms for each of the color channels from the three dimensional histogram (Shafarenko: page 1357, column 1, second paragraph); and

Regarding claim 4, Nakamura in view of Shafarenko teach all the limitations of claim 3. Further Nakamura in view of Shafarenko disclose the method as set forth in claim 3, wherein the color space of step c) is CIELUV color space (Shafarenko: page 1355, column 1, second paragraph) and the color channels of step d) are color channels in the CIELUV color space (Shafarenko: page 1358, column 1, second paragraph).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5309228 to Nakamura in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) further in view of U.S. Patent No. 6647131 to Bradski.

Regarding claim 5, Nakamura in view of Shafarenko teach all the limitations of claim 3. However Nakamura in view of Shafarenko does not disclose the method as set forth in claim 3, step d) further including the step: normalizing the two-dimensional histograms according to predetermined scaling scheme.

Bradski discloses the method as set forth in claim 3, step d) further including the step: normalizing the two-dimensional histograms according to predetermined scaling scheme (column 7, lines 42-48;column 8, lines 24-28).

Nakamura, Shafarenko, and Bradski are combinable because they are in the similar problem area of image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the normalization taught by Bradski to the combined system of Nakamura in view of Shafarenko to implement image segmentation with normalization.

The motivation to combine the reference is clear because normalization facilitates the computation of data.

8. Claims 6, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5309228 to Nakamura in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) further in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 6, Nakamura in view of Shafarenko teach all the limitations of claim 3. However Nakamura in view of Shafarenko does not disclose the method as set forth in claim 3, step e) further including the steps:

f) detecting edges in each of the two-dimensional histograms to create corresponding edge maps ; and

g) performing a connectivity analysis of the edges in each of the edge maps.

Herley discloses the method as set forth in claim 3, step e) further including the steps:

f) detecting edges in each of the two-dimensional histograms to create corresponding edge maps (page 2, paragraph 17, lines 5-8; paragraph 18, lines 1-3, paragraph 21,lines 1-3); and

g) performing a connectivity analysis of the edges in each of the edge maps (page 2, paragraph 18).

Nakamura, Shafarenko, and Herley are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the edge detection/analysis taught by Herley with the combined system of Nakamura in view of Shafarenko to implement edge detection for image segmentation.

The motivation to combine the reference is clear because Herley uses edge detection for the detection of multiple objects in images (page 1, paragraph 5, lines 1-4).

Regarding claim 7, Nakamura in view of Shafarenko further in view of Herley teach all the limitations of claim 6. Further Herley discloses the method as set forth in claim 6, step e) further including the steps :

h) converting the detected edges in each of the edge maps to points in a Hough parametric space (page 2, paragraph 21, lines 1-3);

i) rendering lines from the Hough parametric space on the corresponding edge map (page 2, paragraph 21, lines 8-12); and

j) marking the overlap between the rendered lines and curves and the detected edges on each of the edge maps (page 2, paragraph 21, 5-12).

Regarding claim 8, Nakamura in view of Shafarenko further in view of Herley teach all the limitations of claim 7. Further Herley discloses the method as set forth in claim 7, step e) further including the steps:

k) identifying pairs of parallel line segments in each of the edge maps (page 2, paragraph 22, line 3-9);

l) computing the mid-segment of each pair of parallel line segments in each of the edge maps to complete detection of the sweep segment information for each two-dimensional histogram (page 3, paragraph 33; paragraph 37); and

m) combining the detected sweep segment information (page 3, paragraph 35).

9. Claims 9, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5309228 to Nakamura in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 9, Nakamura teach all the limitations of claim 1. However Nakamura does not disclose the method as set forth in claim 1, further including the step:

c) performing post-processing on the input graphics image to reject segmenting that falsely identified any non-sweep portion of the image as a sweep area and vice versa.

Herley discloses the step:

c) performing post-processing on the input graphics image to reject segmenting that falsely identified any non-sweep portion of the image as a sweep area and vice versa (page 3, paragraph 29-30).

Nakamura and Herley are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the post-processing of Herley with the image segmentation system of Nakamura to implement an accurate segmentation of images.

The motivation to combine the reference is clear because post-processing can help to further eliminate any errors that could occur in the processing of image data.

Regarding claim 10, Nakamura in view of Herley teach all the limitations of claim 9. Further Herley discloses the method as set forth in claim 9, wherein the post-processing includes using a digital filter to reject small isolated areas of sweeps and non-sweeps (page 1, paragraph 16; page 3, paragraph 34, 36).

Regarding claim 11, Nakamura in view of Herley teach all the limitations of claim 9. Further Herley discloses the method as set forth in claim 9, wherein the post-

processing includes computing gradient information and rejecting those sweep areas where the gradient in the image is less than a threshold (page 2, paragraph 18).

Regarding claim 12, Nakamura in view of Herley teach all the limitations of claim 11. Further Herley discloses the method as set forth in claim 11, wherein the post-processing includes computing gradient information at several scales (page 2, paragraph 18, lines 8-11).

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) in view of U.S. Patent No. 5309228 to Nakamura further in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 13, Nakamura in view of Herley teach all the limitations of claim 9. Herley discloses post-processing including rejecting segmenting due to horizontal lines (Herley: page 3, paragraph 34). However Herley does not disclose detection in the U and V color channels.

Shafarenko discloses the use of the LUV color channels (Shafarenko: column 2, lines 3-9).

Shafarenko, Nakamura, and Herley are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the LUV color selection of Shafarenko with the combined system of Shafarenko in view of Nakamura to implement LUV color based image segmentation.

The motivation to combine the reference is clear because Shafarenko teaches that the LUV color space is ideal for human vision system (page 1354, Introduction, first paragraph).

11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) in view of U.S. Patent No. 5309228 to Nakamura.

Regarding claim 14, Shafarenko discloses the method for detecting and segmenting sweeps in a graphics image, including the steps of

a) transforming an input graphics image to a three-dimensional histogram in color space (Shafarenko: page 1355, column 1, second paragraph);

b) estimating two-dimensional histogram for each of the color channels from the three-dimensional histogram(Shafarenko: page 1357, column 1, second paragraph). However Shafarenko does not disclose

c) processing each of the two-dimensional histograms to detect sweep segment information; and

d) segmenting the input graphics image into sweep and non-sweep areas using the sweep segment information.

Nakamura discloses the method of:

c) processing each of the two-dimensional histograms to detect sweep segment information(Nakamura: Nakamura discloses method of feature image extraction wherein the human face is the feature image to be extracted. Thus the feature image

corresponds to the sweep area and the non-feature image is the non-sweep area (column 3, lines 27-44; column 12, lines 43-50); and

d) segmenting the input graphics image into sweep and non-sweep areas using the sweep segment information(column 12, lines 45-55).

Shafarenko and Nakamura are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the processing and segmentation taught by Nakamura with the method of Shafarenko to implement image segmentation with histogram analysis.

The motivation to combine the reference is clear because the method of Nakamura is useful for image feature extraction (column 2, lines 15-20).

Regarding claim 15, Shafarenko in view of Nakamura teach all the limitations of claim 14. Further Shafarenko discloses the method as set forth in claim 14, wherein the color space of step a) is CIELUV color space and the color channels of step b) are color channels in the CIELUV color space(column 2, lines 3-9).

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) in view of U.S. Patent No. 5309228 to Nakamura further in view of U.S. Patent No. 6647131 to Bradski.

Regarding claim 16, Shafarenko in view of Nakamura teach all the limitations of claim 14. However Shafarenko in view of Nakamura does not disclose:

e) normalizing the two-dimensional histograms according to a predetermined scaling scheme.

Bradksi discloses the method of:

e) normalizing the two-dimensional histograms according to a predetermined scaling scheme (column 7, lines 42-48;column 8, lines 24-28).

Shafarenko, Nakamura, and Bradski are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the normalization taught by Bradski with combined methods of Shafarenko in view of Nakamura to implement normalized histogram analysis.

The motivation to combine the reference is clear because normalization facilitates the computation of data.

13. Claims 17, 18, 19, 20, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998) in view of U.S. Patent No. 5309228 to Nakamura further in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 17, Shafarenko in view of Nakamura teach all the limitations of claim 14. However Shafarenko in view of Nakamura does not disclose the method as set forth in claim 14, step c) further including the steps:

e) detecting edges in each of the two-dimensional histograms to create corresponding edge maps;

f) performing a connectivity analysis of the edges in each of the edge map

g) converting the detected edges in each of the edge maps to points in a Hough parametric space;

h) rendering lines from the Hough parametric space on the corresponding edge map; and

i) marking the overlap between the rendered lines and the detected edges on each of the edge maps.

Herley disclose the method including:

e) detecting edges in each of the two-dimensional histograms to create corresponding edge maps(page 2, paragraph 17, lines 5-8; paragraph 18, lines 1-3, paragraph 21,lines 1-3);

f) performing a connectivity analysis of the edges in each of the edge map(page 2, paragraph 18);

g) converting the detected edges in each of the edge maps to points in a Hough parametric space(page 2, paragraph 21, lines 1-3);

h) rendering lines from the Hough parametric space on the corresponding edge map(page 2, paragraph 21, lines 8-12);

and

i) marking the overlap between the rendered lines and the detected edges on each of the edge maps(page 2, paragraph 21, 5-12).

Shafarenko, Nakamura, and Herley are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the edge detection/analysis of Herley with the combined methods of Shafarenko in view of Nakamura to implement edge based image segmentation.

The motivation to combine the reference is clear because Herley teaches that noise can be eliminated by further edge analysis (page 2, paragraph 20, 21).

Regarding claim 18, Shafarenko in view of Nakamura further in view of Herley teach all the limitations of claim 17. Further Herley discloses the method as set forth in claim 17, step c) further including the steps :

j) identifying pairs of parallel line segments in each of the edge maps (page 2, paragraph 22, line 3-9);

k) computing the mid-segment of each pair of parallel line segments in each of the edge maps to complete detection of the sweep segment information for each two-dimensional histogram(page 3, paragraph 33; paragraph 37); and

l) combining the detected sweep segment information(page 3, paragraph 35).

Regarding claim 19, Shafarenko in view of Nakamura teach all the limitations of claim 14. Further Herley discloses the method as set forth in claim 14, further including the step:

e) performing post-processing on the input graphics image to reject segmenting that falsely identified any non-sweep portion of the image as a sweep area and vice versa (page 3, paragraph 29-30).

Regarding claim 20, Shafarenko in view of Nakamura further in view of Herley teach all the limitations of claim 19. Further Herley discloses the method as set forth in claim 19, wherein the post-processing includes using a digital filter to reject small isolated areas of sweeps and non-sweeps (page 1, paragraph 16; p7age 3, paragraph 34, 36).

Regarding claim 21, Shafarenko in view of Nakamura further in view of Herley teach all the limitations of claim 19. Further Herley discloses the method as set forth in claim 19, wherein the post-processing includes computing gradient information and rejecting those sweep areas where the gradient in the image is less than a threshold (page 2, paragraph 18).

Regarding claim 22, Shafarenko in view of Nakamura further in view of Herley teach all the limitations of claim 19. Further Shafarenko in view of Nakamura further in view of Herley disclose the method as set forth in claim 19, wherein the post-processing includes rejecting segmenting due to horizontal lines (Herley: page 3, paragraph 34) detected in the U and V color channels (Shafarenko: column 2, lines 3-9).

14. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5309228 to Nakamura in view of United States Patent Application Publication No. US 2002/0146173 to Herley.

Regarding claim 23, Nakamura discloses a method for detecting and segmenting sweeps in a graphics image, including the steps of:

converting an input graphics image to a color space (column 12, lines 8-15);

projecting the image represented in the color space to a plurality of planes (column 12, lines 21-43);

detecting curves in each plane (column 23, lines 27-35). However Nakamura does not disclose the method of identifying pixels of the color associated with each detected curve and storing such pixel information; and

combining the pixel information for each color to determine if pixels of that color are part of a sweep.

Herley disclose the method of identifying pixels of the color associated with each detected curve and storing such pixel information; and combining the pixel information for each color to determine if pixels of that color are part of a sweep (page 1, paragraph 15; page 3, paragraph 34-35).

Nakamura and Herley are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the pixel analysis of Herley with the method of Nakamura to implement pixel based image segmentation.

The motivation to combine the reference is clear because Herley teaches that this method is useful for detection of multiple objects in images (page 1, paragraph 5, lines 1-4).

15. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Application Publication No. US 2002/0146173 to Herley in view of Shafarenko (IEEE Transactions on Image Processing, Vol. 7, No. 9, September 1998).

Regarding claim 24, Herley discloses the method as set forth in claim 23, wherein:

the image represented in the color space is projected to three orthogonal planes (page 2, paragraph 19, lines 10-17); curves in each plane using are detected using a Hough transform and edge linking (page 2, paragraph 21); pixels of the color associated with each detected curve are identified using a logical label; and the pixel information for each color is combined using a logical AND operation to determine if pixels of that color are part of a sweep (page 2, paragraph 18, paragraph 21). However Herley does not disclose the input graphics image converted to a CIELUV color space.

Shafarenko discloses using CIELUV color space for color analysis (column 2, lines 3-9).

Herley and Shafarenko are combinable because they are in the similar problem area of color image segmentation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the CIELUV color space selection of Shafarenko with the method of Herley to implement CIELUV color based segmentation.

The motivation to combine the reference is clear because Shafarenko teaches that the LUV color space is ideal for human vision system (page 1354, Introduction, first paragraph).

***Other Prior Art Cited***

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5629989 to Osada discloses extraction for image line-segments.

U.S. Patent Application Publication No. 2002/0131495 to Prakash et al disclose filling method for digital images.

U.S. Patent No. 5416890 to Beretta discloses graphic user interface.

U.S. Patent No. 5101440 to Watanabe et al disclose picture processor.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (703) 306-3441. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (703) 306-5631. The group receptionist number for TC 2600 is (703) 305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

***Patent Examiner***

Beniyam Menberu
BM
03/6/2005

MARK WALLERSON
PRIMARY EXAMINER